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| 12,000,000 BC | Reactions between limestone and oil shale during spontaneous combustion occurred in Israel to form a natural deposit of cement compounds. The deposits were characterized by Israeli geologists in the 1960's and 70's. |
| 3000 BC Egyptians | Used mud mixed with straw to bind dried bricks. They also used gypsum mortars and mortars of lime in the pyramids. |
| Chinese | Used cementitious materials to hold bamboo together in their boats and in the Great Wall. |
| 800 BC Greeks, Crete & Cyprus | Used lime mortars which were much harder than later Roman mortars. |
| 300 BC Babylonians & As Syrians | Used bitumen to bind stones and bricks. |
| 300 BC - 476 AD Romans | Used pozzolana cement from Pozzuoli, Italy near Mt. Vesuvius to build the Appian Way, Roman baths, the Coliseum and Pantheon in Rome, and the Pont du Gard aqueduct in south France. They used lime as a cementitious material. Pliny reported a mortar mixture of 1 part lime to 4 parts sand. Vitruvius reported a 2 parts pozzolana to 1 part lime. Animal fat, milk, and blood were used as admixtures (substances added to cement to increase the properties.) These structures still exist today! |
| 1200 - 1500 The Middle Ages | The quality of cementing materials deteriorated. The use of burning lime and pozzolan (admixture) was lost, but reintroduced in the 1300's. |
| 1678 | Joseph Moxon wrote about a hidden fire in heated lime that appears upon the addition of water. |
| 1779 | Bry Higgins was issued a patent for hydraulic cement (stucco) for exterior plastering use. |
| 1780 | Bry Higgins published ”Experiments and Observations Made With the View of Improving the Art of Composing and Applying Calcereous Cements and of Preparing Quicklime.” |
| 1793 | John Smeaton found that the calcination of limestone containing clay gave a lime which hardened under water (hydraulic lime). He used hydraulic lime to rebuild Eddystone Lighthouse in Cornwall, England which he had been commissioned to build in 1756, but had to first invent a material that would not be affected by water. He wrote a book about his work. |
| 1796 | James Parker from England patented a natural hydraulic cement by calcining nodules of impure limestone containing clay, called Parker's Cement or Roman Cement. |
| 1802 | In France, a similar Roman Cement process was used. |
| 1810 | Edgar Dobbs received a patent for hydraulic mortars, stucco, and plaster, although they were of poor quality due to lack of kiln precautions. |
| 1812 -1813 | Louis Vicat of France prepared artificial hydraulic lime by calcining synthetic mixtures of limestone and clay. |
| 1818 | Maurice St. Leger was issued patents for hydraulic cement. Natural Cement was produced in the USA. Natural cement is limestone that naturally has the appropriate amounts of clay to make the same type of concrete as John Smeaton discovered. |
| 1820 - 1821 | John Tickell and Abraham Chambers were issued more hydraulic cement patents. |
| 1822 | James Frost of England prepared artificial hydraulic lime like Vicat's and called it British Cement. |
| 1824 | Joseph Aspdin of England invented portland cement by burning finely ground chalk with finely divided clay in a lime kiln until carbon dioxide was driven off. The sintered product was then ground and he called it portland cement named after the high quality building stones quarried at Portland, England. |
| 1828 | I. K. Brunel is credited with the first engineering application of portland cement, which was used to fill a breach in the Thames Tunnel. |
| 1830 | The first production of lime and hydraulic cement took place in Canada. |
| 1836 | The first systematic tests of tensile and compressive strength took place in Germany. |
| 1843 | J. M. Mauder, Son & Co. were licensed to produce patented portland cement. |
| 1845 | Isaac Johnson claims to have burned the raw materials of portland cement to clinkering temperatures. |
| 1849 | Pettenkofer & Fuches performed the first accurate chemical analysis of portland cement. |
| 1860 | The beginning of the era of portland cements of modern composition. |
| 1862 | Blake Stonebreaker of England introduced the jaw breakers to crush clinkers. |
| 1867 | Joseph Monier of France reinforced William Wand's (USA) flower pots with wire ushering in the idea of iron reinforcing bars (re-bar). |
| 1871 | David Saylor was issued the first American patent for portland cement. He showed the importance of true clinkering. |
| 1880 | J. Grant of England show the importance of using the hardest and densest portions of the clinker. Key ingredients were being chemically analyzed. |
| 1886 | The first rotary kiln was introduced in England to replace the vertical shaft kilns. |
| 1887 | Henri Le Chatelier of France established oxide ratios to prepare the proper amount of lime to produce portland cement. He named the components: Alite (tricalcium silicate), Belite (dicalcium silicate), and Celite (tetracalcium aluminoferrite). He proposed that hardening is caused by the formation of crystalline products of the reaction between cement and water. |
| 1889 | The first concrete reinforced bridge is built. |
| 1890 | The addition of gypsum when grinding clinker to act as a retardant to the setting of concrete was introduced in the USA. Vertical shaft kilns were replaced with rotary kilns and ball mills were used for grinding cement. |
| 1891 | George Bartholomew placed the first concrete street in the USA in Bellefontaine, OH. It still exists today! |
| 1893 | William Michaelis claimed that hydrated metasilicates form a gelatinous mass (gel) that dehydrates over time to harden. |
| 1900 | Basic cement tests were standardized. |
| 1903 | The first concrete high rise was built in Cincinnati, OH. |
| 1908 | Thomas Edison built cheap, cozy concrete houses in Union, NJ. They still exist today! |
| 1909 | Thomas Edison was issued a patent for rotary kilns. |
| 1929 | Dr. Linus Pauling of the USA formulated a set of principles for the structures of complex silicates. |
| 1930 | Air entraining agents were introduced to improve concrete's resistance to freeze/thaw damage. |
| 1936 | The first major concrete dams, Hoover Dam and Grand Coulee Dam, were built. They still exist today! |
| 1956 | U.S. Congress annexed the Federal Interstate Highway Act. |
| 1967 | First concrete domed sport structure, the Assembly Hall, was constructed at The University of Illinois, at Urbana-Champaign. |
| 1970 | Fiber reinforcement in concrete was introduced. |
| 1975 | CN Tower in Toronto, Canada, the tallest slip-form building, was constructed. Water Tower Place in Chicago, Illinois, the tallest building was constructed. |
| 1980 | Superplasticizers were introduced as admixtures. |
| 1985 | Silica fume was introduced as a pozzolanic additive. The "highest strength" concrete was used in building the Union Plaza constructed in Seattle, Washington. |
| 1992 | The tallest reinforced concrete building in the world was constructed at 311 S. Wacker Dr., Chicago, Illinois. |

Historical Concrete and Cement Timeline

- See more at: http://www.cemexusa.com/ProductsServices/ReadyMixConcreteHistoryFacts.aspx#sthash.YHJM8aPb.dpuf